LIMNOLOGY AND OCEANOGRAPHY

41027°

Volume 13, 1968

LIBRARY
BUREAU OF COMMERCIAL FISHERIES
U. S. FISH AND WILDLIFE SERVICE
P. O. BOX 3830
HONOLULU HAWAII

PUBLISHED QUARTERLY AT LAWRENCE, KANSAS
By
THE AMERICAN SOCIETY OF LIMNOLOGY AND OCEANOGRAPHY, INC.

AMERICAN SOCIETY OF LIMNOLOGY AND OCEANOGRAPHY, INC.

Officers and Board of Directors

President: F. Ronald Hayes, Fisheries Research Board of Canada, Ottawa
President Elect: Timothy R. Parsons, Fisheries Research Board of Canada, Nanaimo, B.C.
Vice-President: Donald W. Hood, University of Alaska
Secretary: George H. Lauff, Michigan State University
Treasurer: Alfred M. Beeton, University of Wisconsin at Milwaukee
Past President: Charles R. Goldman, University of California, Davis
President of Pacific Section: Thomas G. Northcote, University of British Columbia
Secretary-Treasurer of Pacific Section: Eric Barham, U.S. Navy Electronics Laboratory, San Diego
Members-at-Large: John D. H. Strickland, University of California, San Diego (1966–1969)
Marston C. Sargent, Scripps Institution of Oceanography (1967–1970)
Robert G. Wetzel, Michigan State University (1968–1971)

LIMNOLOGY AND OCEANOGRAPHY

Limnology and Oceanography is a journal published quarterly (Jan., April, July, Oct.) at Lawrence, Kansas, by the American Society of Limnology and Oceanography, Inc.

Editor

Yvette H. Edmondson (1968–1971)

Assistant Editor
Francis A. Richards

Editorial Associate
Raelyn Cole

Editorial Board

Bostwick H. Ketchum, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts (1966–1969)
Lawrence R. Pomeroy, University of Georgia (1966–1969)
John R. Vallentyne, Fisheries Research Board of Canada, Winnipeg, Manitoba (1966–1969)
A. F. Bartsch, Federal Water Pollution Control Administration, Pacific Northwest Water Laboratory (1967–1970)
Richard C. Dugdale, University of Washington (1967–1970)
Frank H. Rigler, University of Toronto (1967–1970)
Richard W. Castenholz, University of Oregon (1968–1971)
Holger W. Jannasch, Woods Hole Oceanographic Institution (1968–1971)
John D. H. Strickland, University of California, San Diego (1968–1971)

Membership in the Society is open to persons actively interested in any aspect of limnology or oceanography. Candidates for membership shall be nominated by two active members of the Society. The annual dues of the Society are $10.00; student members, $7.50; associate members, $1.00. Nomination blanks and further information pertaining to the Society can be obtained from the Secretary.

The subscription rate to Limnology and Oceanography for libraries and nonmembers is $12.50 per year. Subscriptions are payable to the Treasurer. Remittances from countries other than the United States must be paid in U.S. currency or its full equivalent. Changes of address should be sent promptly to the Treasurer.

Publication Office: Allen Press Inc., Lawrence, Kansas 66044, U.S.A.

Secretary's Office: Dr. George H. Lauff, W. K. Kellogg Biological Station, Michigan State University, Hickory Corners 49060.

Treasurer's Office: Dr. Alfred M. Beeton, Zoology Department, University of Wisconsin at Milwaukee 53211.

Editorial Office: Dr. Yvette H. Edmondson, Dept. of Zoology, University of Washington, Seattle 98105.

© Copyright, 1969, by the American Society of Limnology and Oceanography, Inc.
Second-class postage paid at Lawrence, Kansas, U.S.A. 66044

TABLE OF CONTENTS

Volume 13, 1968

Number 1, January

Tyler, John E. The Secchi disc 1

Rigler, F. H. Further observations inconsistent with the hypothesis that the molybdenum blue method measures orthophosphate in lake water 7

Steele, J. H., and I. E. Baird. Production ecology of a sandy beach 14

Bradshaw, John S. Environmental parameters and marsh Foraminifera 26

Connors, Donald N., and Peter K. Weyl. The partial equivalent conductances of salts in seawater and the density/conductance relationship 39

Comita, Gabriel W. Oxygen consumption in *Diaptomus* 51

Bishop, John W. Respiratory rates of migrating zooplankton in the natural habitat 58

Martin, John H. Phytoplankton–zooplankton relationships in Narragansett Bay. III. Seasonal changes in zooplankton excretion rates in relation to phytoplankton abundance 63

Sheldon, R. W. Sedimentation in the estuary of the River Crouch, Essex, England .. 72

Small, Lawrence F., and Herbert Curl, Jr. The relative contribution of particulate chlorophyll and river tripton to the extinction of light off the coast of Oregon 84

Odum, William E. The ecological significance of fine particle selection by the striped mullet *Mugil cephalus* 92

Johnson, M. G., and D. H. Matheson. Macroinvertebrate communities of the sediments of Hamilton Bay and adjacent Lake Ontario 99

Sanders, Herman O., and Oliver B. Cope. The relative toxicities of several pesticides to naiads of three species of stoneflies 112

Bedford, J. W., E. W. Roelofs, and M. J. Zabik. The freshwater mussel as a biological monitor of pesticide concentrations in a lotic environment 118

Lovett, J. R. Vertical temperature gradient variations related to current shear and turbulence 127

Longhurst, Alan R. Distribution of the larvae of *Pleuroncodes planipes* in the California Current 143

Harder, Wilhelm. Reactions of plankton organisms to water stratification 156

Notes and Comment

Biggs, Robert B., and Carolyn D. Wetzel. Concentration of particulate carbohydrate at the halocline in Chesapeake Bay 169

Parker, Bruce C., George Leeper, and William Hurni. Sampler for studies of thin horizontal layers 172

Holm-Hansen, Osmund. Determination of particulate organic nitrogen 175

Paasche, E. The effect of temperature, light intensity, and photoperiod on coccolith formation 178

Anderson, David W., and Douglas W. Larson. A bottom-type emergence trap for rough water conditions 181

Otsuki, Akira, and Takahisa Hanya. On the production of dissolved nitrogen-rich organic matter 183

Gold, Kenneth. Some factors affecting the stability of thiamine 185

Tietjen, John H. Chlorophyll and pheo-pigments in estuarine sediments 189

Swinnerton, J. W., V. J. Linnenbom, and C. H. Cheek. A sensitive gas chromatographic method for determining carbon monoxide in seawater 193

Scarola, John F., and Anthony J. Novotny. Folsom plankton splitter modified for enumeration of Entomostraca 195

Cowell, Bruce C., and Patrick L. Hudson. A device for determining sedimentation rates in reservoirs 196

Ziebell, Charles D., William J. McConnell, and Howard A. Baldwin. A sonic remote recovery device for submerged equipment 198

Pullen, E. J., C. R. Mock, and R. D. Ringo. A net for sampling the intertidal zone of an estuary 200

Lorenzen, Carl J. Carbon/chlorophyll relationships in an upwelling area 202

Book Reviews

Methods in geochemistry and geophysics. 7. Atomic absorption spectrometry in geology (E. E. Angino and G. K. Billings) ..... T. Joyner 205

Microbiology of oceans and estuaries (E. J. F. Wood) — Thomas D. Brock 205
Primary productivity in aquatic environments (C. R. Goldman [ed.]) W. T. Edmondson 206
The biology of marine animals, 2nd ed. (J. A. C. Nicol) — Robert T. Paine 207
Studies on Loch Lomond 2. The fauna of the River Endrick (P. S. Maitland) H. B. N. Hynes 207
Tides (D. H. Macmillan) — L. H. Larsen 208
Limnofauna Europea (J. Illies [ed.]) — W. T. Edmondson 208

Proceedings of the American Society of Limnology and Oceanography, Inc. — 209

Number 2, April

Kuznetsov, S. I. Recent studies on the role of microorganisms in the cycling of substances in lakes — 211
Trüper, Hans G., and Sebastiano Genovese. Characterization of photosynthetic sulfur bacteria causing red water in Lake Faro (Messina, Sicily) — 225
Brown, Seward R. Bacterial carotenoids from freshwater sediments — 233
Roth, James C. Benthic and limnetic distribution of three *Chaoborus* species in a southern Michigan lake (Diptera, Chaoboridae) — 242
LaRow, Edward J. A persistent diurnal rhythm in *Chaoborus* larvae. I. The nature of the rhythmicity — 250
Einarsson, E., and A. B. Lowe. Seiches and set-up on Lake Winnipeg — 257
Takahashi, Taro, Wallace Broecker, Yuan Hui Li, and David Thurber. Chemical and isotopic balances for a meromictic lake — 272
Emery, Alan R. Preliminary observations on coral reef plankton — 293
Veeh, H. Herbert, and Karl K. Turekian. Cobalt, silver, and uranium concentrations of reef-building corals in the Pacific Ocean — 304
Patten, Bernard C., and George M. Van Dyne. Factorial productivity experiments in a shallow estuary: energetics of individual plankton species in mixed populations 309
Wiebe, Peter Howard, and William Robert Holland. Plankton patchiness: effects on repeated net tows — 315
Hastenrath, Stefan L. Estimates of the latent and sensible heat flux for the Caribbean Sea and the Gulf of Mexico — 322
Hargrave, Barry T., and Glen H. Geen. Phosphorus excretion by zooplankton — 332
McConnell, William J. Limnological effects of organic extracts of litter in a southwestern impoundment — 343
Jeffrey, S. W. Photosynthetic pigments of the phytoplankton of some coral reef waters — 350
Vaccaro, Ralph F., Sonja E. Hicks, Holger W. Jannasch, and Francis G. Carey. The occurrence and role of glucose in seawater — 356

Notes and Comment

Hicks, Sonja E., and Francis G. Carey. Glucose determination in natural waters 361
Kibby, H. V., J. R. Donaldson, and C. E. Bond. Temperature and current observations in Crater Lake, Oregon — 363
Gorham, Eville. Journal coverage in the field of limnology — 366
Rao, Desiraju B. A note on the free gravitational oscillations in a rectangular basin of variable depth — 369
Marshall, Harold G. Coccolithophores in the northwest Sargasso Sea — 370
Wells, J. M., and J. E. Warinner. A recording volumetric respirometer for aquatic animals — 376
Baird, I. E., and R. G. Wetzel. A method for the determination of zero thickness activity of ^{14}C labeled benthic diatoms in sand — 379
Williams, George C. Bathymetric distribution of planktonic fish eggs in Long Island Sound — 382
Coulter, G. W. Thermal stratification in the deep hypolimnion of Lake Tanganyika — 385
Chesher, Richard H. Transport of marine plankton through the Panama Canal 387
Strickland, J. D. H. A comparison of profiles of nutrient and chlorophyll concentrations taken from discrete depths and by continuous recording — 388
Collier, Albert, Gale M. Finlayson, and Edwin W. Cake. On the transparency of the sea (Observations made by Mr. Cialdi and P. A. Secchi) — 391

Book Reviews

Australian inland waters and their fauna (A. H. Weatherly [ed.]) ..... Lars H. Carpelan 395
Hydrobiological studies I (J. Hrbáček [ed.]) ..... David G. Frey 395
"Meteor" Forschungsergebnisse ..... Karl Banse 397
The biological basis of freshwater fish production (S. D. Gerking [ed.]) ..... Karl F. Lagler 398
Harvest of the sea (J. Bardach) ..... Dixie Lee Ray 398

Books Received 400

Number 3, July

Culberson, C., and R. M. Pytkowicz. Effect of pressure on carbonic acid, boric acid, and the *p*H in seawater 403
Spilhaus, A. F., Jr. Observations of light scattering in seawater 418
Smith, Raymond C. The optical characterization of natural waters by means of an "extinction coefficient" 423
Nriagu, Jerome O. Sulfur metabolism and sedimentary environment: Lake Mendota, Wisconsin 430
Seki, H., J. Skelding, and T. R. Parsons. Observations on the decomposition of a marine sediment 440
Fager, Edward W. A sand-bottom epifaunal community of invertebrates in shallow water 448
Barnes, Nora B., and Adrian M. Wenner. Seasonal variation in the sand crab *Emerita analoga* (Decapoda, Hippidae) in the Santa Barbara area of California 465
Hammer, U. Theodore, and William W. Sawchyn. Seasonal succession and congeneric associations of *Diaptomus* spp. (Copepoda) in some Saskatchewan ponds 476
Becacos-Kontos, Theano. The annual cycle of primary production in the Saronicos Gulf (Aegean Sea) for the period November 1963–October 1964 485
Pearcy, William G., and Charles L. Osterberg. Zinc-65 and manganese-54 in albacore *Thunnus alalunga* from the west coast of North America 490
Mulligan, Hugh F., and John M. Kingsbury. Application of an electronic particle counter in analyzing natural populations of phytoplankton 499
Holm-Hansen, Osmund, William H. Sutcliffe, Jr., and Jonathan Sharp. Measurement of deoxyribonucleic acid in the ocean and its ecological significance 507

Notes and Comment

Solórzano, L., and J. D. H. Strickland. Polyphosphate in seawater 515
Doyle, Roger W. Isolation of enzymes and other organic anions from freshwater sediment 518
Kormondy, Edward J. Weight loss of cellulose and aquatic macrophytes in a Carolina bay 522
Bradford, G. R., F. L. Bair, and V. Hunsaker. Trace and major element content of 170 High Sierra lakes in California 526
Wilkniss, P. K., and V. J. Linnenbom. The determination of fluorine in seawater by photon activation analysis 530
Kim, Young Sik, and Harry Zeitlin. The determination of molybdenum in seawater 534
Pamatmat, Mario M., and Douglas Fenton. An instrument for measuring subtidal benthic metabolism *in situ* 537
Duke, Thomas W., James N. Willis, and Douglas A. Wolfe. A technique for studying the exchange of trace elements between estuarine sediments and water 541
Carey, Andrew G., Jr., and Roger R. Paul. A modification of the Smith-McIntyre grab for simultaneous collection of sediment and bottom water 545
Rowe, Gilbert T., and Robert J. Menzies. Orientation in two bathyal, benthic decapods, *Munida valida* Smith and *Parapagurus pilosimanus* Smith 549
Packard, Theodore T., and Peter B. Taylor. The relationship between succinate dehydrogenase activity and oxygen consumption in the brine shrimp *Artemia salina* 552
Holland, Ruth E. Correlation of *Melosira* species with trophic conditions in Lake Michigan 555

Lovett, Jack R. Determination of salinity from simultaneous measurements of sound velocity, temperature, and pressure 557
Beers, Gary D., and John M. Neuhold. Measurement of stream periphyton on paraffin-coated substrates 559
deNoyelles, Frank, Jr. A stained-organism filter technique for concentrating phytoplankton 562

Book Reviews

Marine molluscs as hosts for symbioses (T. C. Cheng) ..... Alan J. Kohn 566
Ecological development in polar regions, a study in evolution (M. J. Dunbar) ..... Gordon H. Orians 566

Number 4, October

Hynes, H. B. N., and Mary J. Coleman. A simple method of assessing the annual production of stream benthos 569
Eppley, Richard W. An incubation method for estimating the carbon content of phytoplankton in natural samples 574
Ghassemi, Masood, and R. F. Christman. Properties of the yellow organic acids of natural waters 583
Prakash, A., and M. A. Rashid. Influence of humic substances on the growth of marine phytoplankton: dinoflagellates 598
Taub, Frieda B., and Alexander M. Dollar. The nutritional inadequacy of *Chlorella* and *Chlamydomonas* as food for *Daphnia pulex* 607
Sherman, Kenneth, and Everett G. Schaner. Observations on the distribution and breeding of *Sagitta elegans* (Chaetognatha) in coastal waters of the Gulf of Maine 618
Duxbury, Alyn C., and Noel B. McGary. Local changes of salinity and nutrients off the mouth of the Columbia River 626
Albright, Lawrence J., and Richard Y. Morita. Effect of hydrostatic pressure on synthesis of protein, ribonucleic acid, and deoxyribonucleic acid by the psychrophilic marine bacterium, *Vibrio marinus* 637
Takahashi, Masayuki, and Shun-ei Ichimura. Vertical distribution and organic matter production of photosynthetic sulfur bacteria in Japanese lakes 644
Johnson, Roy M., Rose Mary Schwent, and Wesley Press. The characteristics and distribution of marine bacteria isolated from the Indian Ocean 656
Fee, Everett J., and Roger W. Bachmann. An empirical study of the Defant method of seiche analysis 665
Kester, Dana R., and Ricardo M. Pytkowicz. Magnesium sulfate association at 25C in synthetic seawater 670
Burns, Carolyn W. The relationship between body size of filter-feeding Cladocera and the maximum size of particle ingested 675
Welch, Harold E. Use of modified diurnal curves for the measurement of metabolism in standing water 679

Notes and Comment

Ben-Yaakov, S., and I. R. Kaplan. *p*H-temperature profiles in ocean and lakes using an *in situ* probe 688
Fournier, Robert O. Observations of particulate organic carbon in the Mediterranean Sea and their relevance to the deep-living coccolithophorid *Cyclococcolithus fragilis* 693
Deka, Jerzy, and Howard R. Gordon. Light field fluctuations in the photic zone 697
Robertson, Andrew, Charles F. Powers, and Robert F. Anderson. Direct observations on *Mysis relicta* from a submarine 700
Wells, LaRue. Daytime distribution of *Pontoporeia affinis* off bottom in Lake Michigan 703
Freudenthal, Hugo D., Stoecker, Roy, and Walter Blogoslowski. The use of the pneumatic ejector pump in oceanography 706
Menzies, Robert J., and Gilbert T. Rowe. The LUBS, a large undisturbed bottom sampler 708
Burke, John C. A sediment coring device of 21-cm diameter with sphincter core retainer 714
Hair, Malcolm E., James E. Alexander, and John J. A. McLaughlin. An inexpensive apparatus for sampling shallow water 718

DUTHIE, H. C., AND J. SHAW. A compressed air motor shaker for use in small incubators 719
CARPENTER, EDWARD J. A simple, inexpensive algal chemostat 720
BISHOP, J. E., AND J. B. BISHOP. A technique for selectively marking aquatic insects with ^{32}P 722

Book Reviews

Estuaries (G. H. Lauff [ed.]) ..... CLIFFORD A. BARNES 725
Marine chemistry (D. F. Martin) ..... T. R. PARSONS 726
Algenvegetation der Felsen (S. Golubić) ..... B. FOTT 726
Distribution of the euphausiid crustacean *Meganyctiphanes norvegica* (M Sars) (J. Mauchline and L. R. Fisher) ..... BRIAN P. BODEN 727
Water resources and public policy (T. H. Campbell and R. O. Sylvester [eds.]) ..... ARTHUR D. HASLER 728
Fisheries biology: a study in population dynamics (D. H. Cushing) L. M. DICKIE 729
Methods for assessment of fish production in fresh waters (W. E. Ricker [ed.]) ..... W. F. ROYCE 730
Chemical environment in the aquatic habitat (H. L. Golterman) ..... RICHARD C. DUGDALE 730
Optical oceanography (N. G. Jerlov) ..... JOHN TYLER 731

Announcements 732

INDEX TO VOLUME 13 733